

## Sabre Series

D38999 Size 09 Optical Transmitter,  
PCB Mount, \*ELIO<sup>®</sup>, 850nm-ARINC  
818, 664, 803 & 804 Compliant



Optical Transmitter, Double Flange Jam Nut

### FEATURES

- Compliant with ARINC 664, 818, 803 & 804
- Suitable for Fast Ethernet, Gigabit Ethernet, 1x/2x/4xFibre Channel and sFPDP applications from 50Mbps to 5.0Gbps
- Maximum optical channel bit error rate less than  $1 \times 10^{-12}$
- Operating temperature range from -55°C to +85°C
- Shock and vibration resistant per RTCA / D0-160E
- Six pin PCB footprint with TX\_Fault and TX\_Dis functions
- ELIO<sup>®</sup> 2.5mm ceramic optical fiber ferrule connector interface per EN 4531, ABS 1379 and ARINC 801
- Compatible with D38999 Size 09-01 ELIO connectors

### APPLICATIONS

Sabre series printed circuit board mounted optical transmitters enable high speed network communications over long distances in harsh environments.

- Fibre Channel switches and peripherals
- Serial Rapid I/O (sRIO) interfaces
- sFPDP data links
- Video displays

This D38999 size 09-01 shell provides a rugged optical interface that is compliant with ELIO<sup>®</sup> 2.5mm ceramic optical ferrules\*.

The multimode optical fiber interface supports applications where copper cable link distance, bandwidth, weight or bulk make the use of twisted pair, twinax or quadax copper conductors unacceptable.

\*ELIO<sup>®</sup> is a registered trademark of Esterline Souriau

One TX Channel Operating from 50Mbps to 5.0Gbps

### DESCRIPTION

Sabre series D38999 size 09-01 optical transmitters consist of optoelectronic transmitter functions integrated into a wall mounted connector assembly. The optical transmitters are 850nm VCSEL lasers. The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ and TX-) lines. Dual loop, temperature compensated, VCSEL drivers convert the transmitter input signals to suitable VCSEL bias and modulation currents. The TX\_Fault circuit disables the optical transmitter output when the optical output power or internal current exceeds predefined limits. The fault condition is latched until reset by a toggle of TX\_Dis or V<sub>CC</sub>. A CMOS fault signal is generated on the TX\_Fault line upon a transmitter optical or electrical fault condition.

The optical mating interface to the Sabre series D38999 size 09-01 optical transmitters is an ELIO<sup>®</sup> 2.5mm ceramic fiber optic ferrule stub per EN 4531. The ferrule stub has an integral 50/125µ multimode optical fiber enabling it to interface to either 62.5/125µ or 50/125µ optical fiber cable.

The electrical interface to the Sabre series D38999 size 09-01 optical transmitters is a six position pin header suitable for thru-hole soldering to a flexible or rigid printed circuit.

Sabre series D38999 size 09-01 optical transmitters are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

### ORDERING INFORMATION

Application	Part Number
Optical TX from 50Mbps to 5.0Gbps	D86J-TS1G-AF

See Appendix A2 for more part number options

# Facilitating Secure Communications in Harsh Environments

Single Fiber Sabre Series MIL-DTL-38999 Optical Transmitter,  
ARINC 818, 1x/2x/4xFC and sFPDP Applications, Multimode, 850nm VCSELs

## ABSOLUTE MAXIMUM RATINGS

Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Storage Temperature	$T_s$	-65		+100	°C
Supply Voltage	$V_{cc}$	-0.5		+4.5	V

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	$T_A$	-55		+85	°C
Power Supply Voltage	$V_{cc}$	+3.135		+3.465	V
Power Supply Noise (p-p)	$N_p$			200	mV

## SPECIFICATIONS COMPLIANCE

Requirement	Feature	Condition	Notes
RTCA / D0-160E	ESD	Class II	2200V
RTCA / D0-160E	Vibration	3.8g <sup>2</sup> /Hz	43G rms
RTCA / D0-160E	Shock	40.0g	6-9mS
RTCA / D0-160E	Flame Resistance	Method 1012	30 Seconds
RTCA / D0-160E	Damp Heat	10 Cycles	24 Hours
EN4531	Mating Durability	500 Cycles	<0.5dB Change
FDA / CDRH / IEC-825-1	Eye Safety	Class 1	No Safety Interlocks Required

## MATERIALS

Item	Detail	Notes
EN3645 Shell	Aluminum	
EN3645 Shell Finish	NI, OD-CD or ZN-NI	
Insert	Aluminum	
Optical Ferrules and Alignment Sleeves	Ceramic	
Printed Circuits	FR-4	

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## OPTICAL TRANSMITTERS $T_A$ = Operating Temperature Range, $V_{CC}$ = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power (BER<math>10^{-12}</math>)	$P_o$	-6.5		-1.0	dBm
Optical Output Wavelength	$\lambda_{OUT}$	830	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nM
Extinction Ratio 50Mbps to 2.49Gbps 2.5Gbps to 5.0Gbps	ER	9.0 6.0			dB

## POWER SUPPLY CURRENT $T_A$ = Operating Temperature Range, $V_{CC}$ = 3.135V to 3.465V

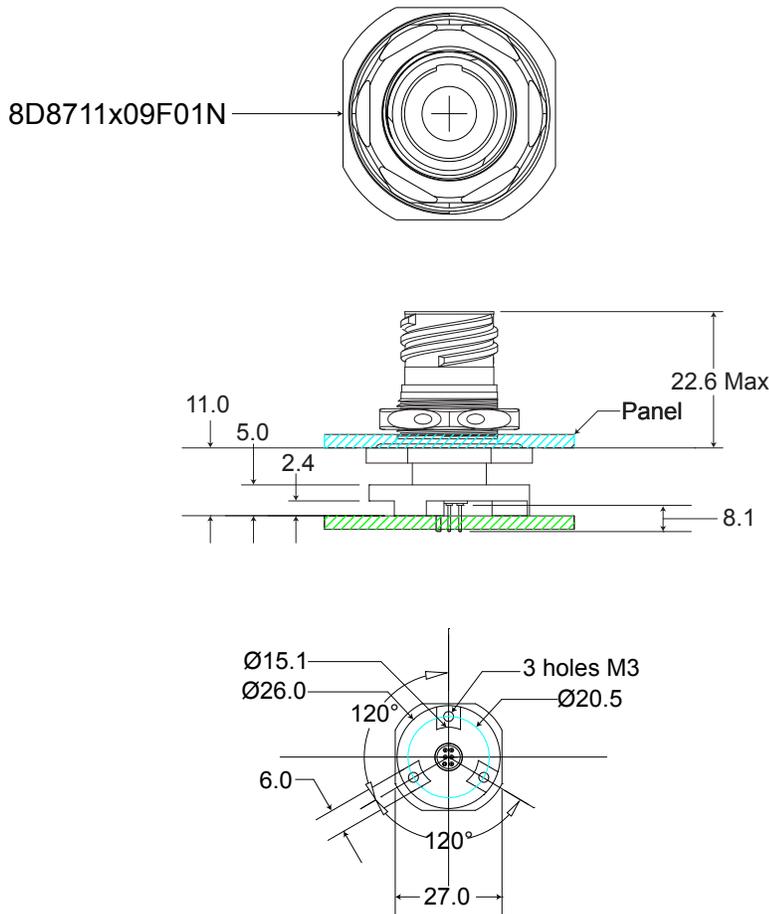
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per transmitter	$I_{CCT}$		80	110	mA

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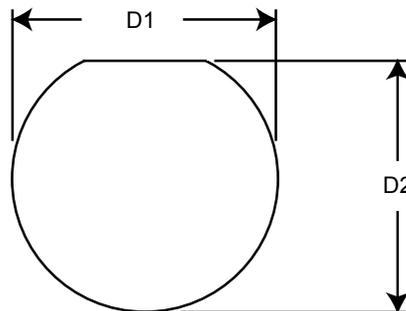
## OUTLINE DRAWING

Dimensions are shown as: mm



### Panel Cutout Dimensions

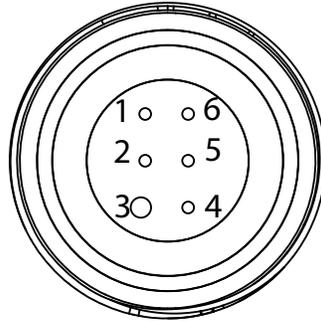
Shell Size Code	Shell Size	D1 Max	D2 Max
A	09	0.710 (18.03)	0.680 (17.27)



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## OPTICAL TRANSMITTER ELECTRICAL INTERFACE TOP

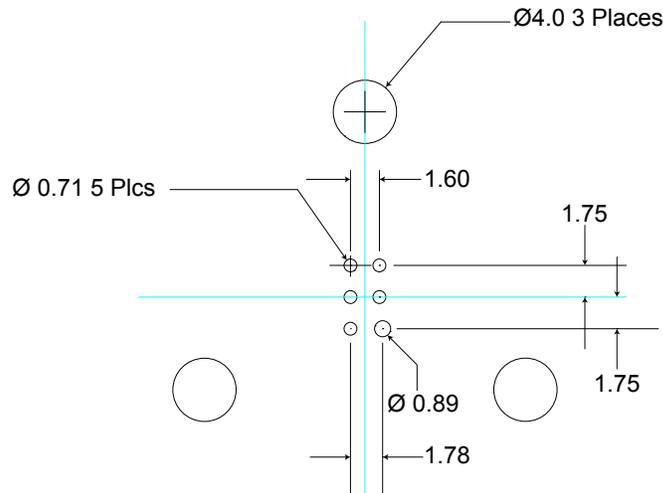


### ELECTRICAL PIN ASSIGNMENTS

Pin Number	Symbol	Description	Logic Family
1	TX_DIS	Transmit Disable - Input Logic 1: Disable Optical Output Logic 0: Enable Optical Output	CMOS Internal 4.7KΩ to 10.0KΩ pullup / pulldown
2	V <sub>cc</sub>	Power Supply	N/A
3	GND	Ground	N/A
4	TX_Fault	Internal TX Fault Indicator - Output Satisfactory Operation: Logic "0" Output Internal Fault: Logic "1" Output	Open Drain CMOS
5	TX-	Transmitter Data Input	CML
6	TX+	Transmitter Data Input	CML

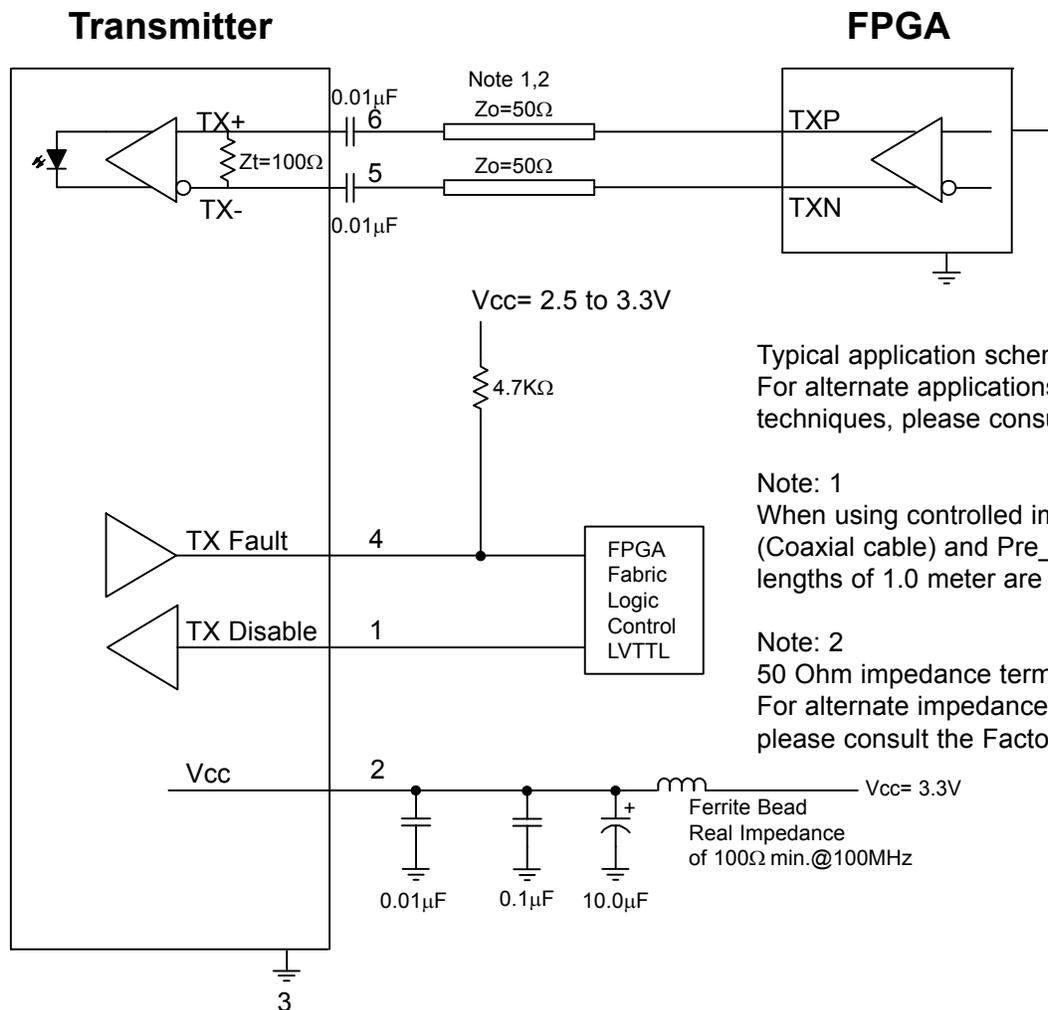
### PRINTED CIRCUIT BOARD FOOTPRINT

Dimensions are shown as: mm  
PCB Hole Pattern - Mounting Side View



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## APPLICATION SCHEMATIC



Typical application schematic shown  
For alternate applications or termination  
techniques, please consult the Factory

Note: 1  
When using controlled impedance cable  
(Coaxial cable) and Pre\_Emphasis,  
lengths of 1.0 meter are obtainable.

Note: 2  
50 Ohm impedance termination shown.  
For alternate impedance requirements,  
please consult the Factory.

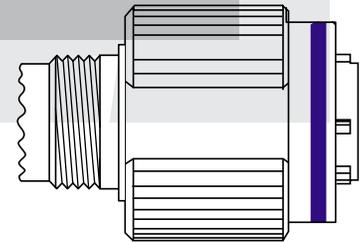
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## APPENDIX A1 Mating Fiber Optic Connectors and Termini

### ELIO® Plug Connector

	8D	5	E	09	F	01	A	N
Shell type: 5: Plug								
Designation: E: ELIO® optical connector								
Shell size: 09								
Plating: Aluminum:								
F: Nickel								
Layouts:								
Insert type: A: Male insert								
Polarization: N, A, B, C, D, E,								



### ELIO® multimode contact Ordering information

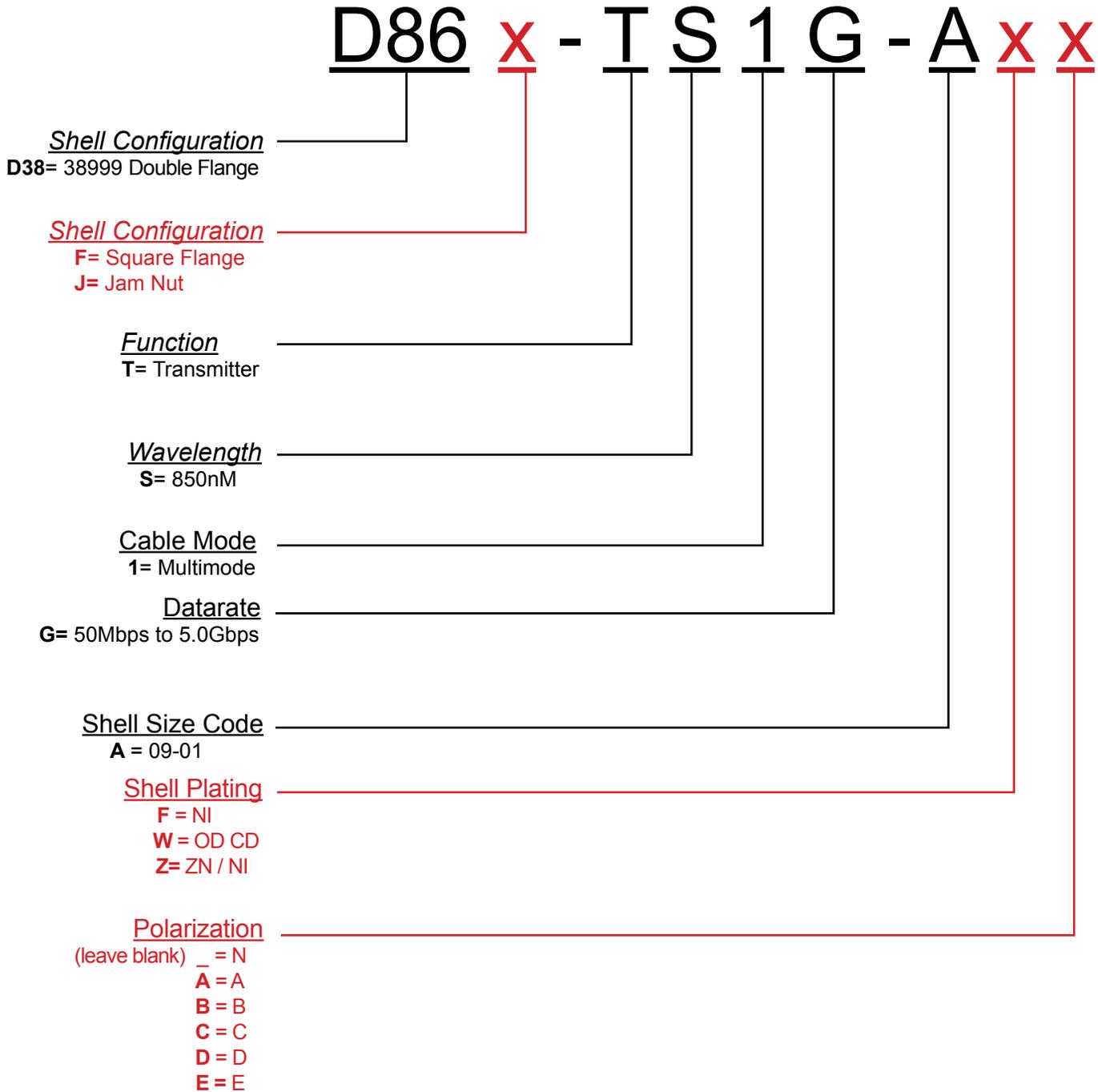
	ELIO	09N	G	L	A
Cable external diameter & Contact sealing: 09N: 0.9 <sup>±0.1</sup> mm. Non waterproof 18N: from 1.5mm to 1.9mm. Non waterproof 18W: 1.8 <sup>±0.1</sup> mm. Waterproof 20N: from 1.7mm to 2.1mm. Non waterproof 20W: 2.0 <sup>±0.1</sup> mm. Waterproof					
Fibre type: G: ELIO® Multimode					
Boot type: L: Long boot S: Short boot N: No boot (non waterproof version only)					
Contact version index					



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## APPENDIX A2 PART NUMBER OPTIONS Sabre Series Transmitters



Other wavelength, mounting and port count options are available.  
Please consult the Protokraft website for alternate configurations.